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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/752,642	01/07/2004	Naofumi Nakamura	790001-2042	4109
20999	7590	05/26/2005	EXAMINER	
FROMMER LAWRENCE & HAUG 745 FIFTH AVENUE- 10TH FL. NEW YORK, NY 10151			FENTY, JESSE A	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 05/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/752,642

Applicant(s)

NAKAMURA ET AL.

Examiner

Jesse A. Fenty

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-10, 13 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-6, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01/07/04, 04/26/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I, claims 1-14 in the reply filed on 02/09/05 is acknowledged.
2. Claims 15-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02/09/05.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 5, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Chan (U.S. Patent No. 6,518,173 B1).

In re claims 1 and 2, Chan (esp. Fig. 6) discloses a semiconductor device, comprising:

at least two wiring layers (11, 22);

a via contact (15) formed between the at least two layers and made of a metal wiring material which is the same as that of the at least two wiring layers (copper);

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wherein the metal wiring material of the via contact contains an additive (Cr) which is not contained in the metal wiring materials of the at least two wiring layers.

In re claim 5, Chan (esp. Fig. 6) discloses a semiconductor device, comprising:

at least two wiring layers (11, 22); and

a via contact formed between the at least two layers and made of a metal wiring material (Cu) which is the same as that of the at least two wiring layers,

wherein metal wiring materials of the at least two wiring layers contain at least one additive (Ta), and

a metal wiring material of the via contact contains at least two additives (Ta based compound) which include an additive (Ta) which is the same as that contained in the metal wiring materials of the at least two wiring layers.

In re claims 11 and 12, Chan (esp. Fig. 6) discloses a semiconductor device, comprising:

a first metal wiring layer (11) made of a first wiring material (Cu), formed in a first wiring groove formed in a first insulating film (12) on a semiconductor substrate (8);

a second insulating film (13) on the first insulating film having the first wiring layer embedded therein;

a via contact (15) embedded in a via hole formed in the second insulating film, the via contact being made of the same wiring material as the first wiring material, which contains an additive (Cr) which is not contained in the first wiring material the first wiring layer;

a third insulating film (19) on the second insulating film having the via contact formed therein; and

a second metal wiring layer (22) embedded in a second wiring groove formed in the third insulating film, the second metal wiring layer being made of the same metal wiring material as the metal wiring material of the first metal wiring layer.

3. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Ng et al. (U.S. Patent No. 6,852,605 B2).

In re claims 1 and 2, Ng (esp. Fig. 10) discloses a semiconductor device, comprising:  
at least two wiring layers (20, 50);  
a via contact (36) formed between the at least two layers and made of a metal wiring material which is the same as that of the at least two wiring layers (copper);  
wherein the metal wiring material of the via contact contains an additive (Al) which is not contained in the metal wiring materials of the at least two wiring layers.

In re claim 3, Ng discloses the device of claim 1, wherein the metal wiring material is Al and the additive is Cu (column 4, lines 25-28; column 5, lines 5-8, 60-63).

In re claim 4, Ng discloses the device of claim 1, wherein the metal wiring material is Ag and the additive is Cu (column 4, lines 25-28; column 5, lines 5-8, 60-63).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan (as above).

In re claim 6, Chan discloses the device of claim 5, wherein the at least one additive comprises Ta, but does not expressly disclose the at least one additive comprising Ti. Ti is a well known substitute for Ta and it would have been obvious for one skilled in the art at the time of the invention to substitute Ti for Ta in the device of Chan for the purpose, for example, of enhancing the conductivity of the device.

*Allowable Subject Matter*

6. Claims 7-10, 13 and 14 are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter:

a. In re claims 7 and 13, the semiconductor device wherein at least a concentration of the same additive in metal wiring material of the via contact being higher than that of the same additive in the metal wiring material of the at least two wiring layers is neither anticipated nor obvious over the prior art of record.

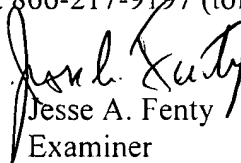
b. In re claim 9, the semiconductor device wherein a concentration of the at least one additive commonly contained in the metal wiring materials of the at least two wiring layers and the metal wiring material of the via contact is higher in the metal wiring material of the via contact than in the metal wiring materials of the at least two wiring layers is neither anticipated nor obvious over the prior art of record.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jesse A. Fenty  
Examiner  
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